OPERATOR'S MANUAL
INCLUDING: OPERATION, INSTALLATION & MAINTENANCE

PE10X-XXX-XXX-XXXX
PE15X-XXX-XXX-XXXX
PE20X-XXX-XXX-XXXX
PE30X-XXX-XXX-XXXX

ELECTRONIC INTERFACE
for Diaphragm Pumps

RELEASED: 3-26-13
(REV. B)

READ THIS MANUAL CAREFULLY BEFORE INSTALLING, OPERATING OR SERVICING THIS EQUIPMENT.

It is the responsibility of the employer to place this information in the hands of the operator. Keep for future reference.

PUMP DATA

PE10X-XXX-XXX-XXXX is PE series 1" EXP Diaphragm Pumps with electronic interface

PE15X-XXX-XXX-XXXX is PE series 1- 1/2" EXP Diaphragm Pumps with electronic interface

PE20X-XXX-XXX-XXXX is PE series 2" EXP Diaphragm Pumps with electronic interface

PE30X-XXX-XXX-XXXX is PE series 3" EXP Diaphragm Pumps with electronic interface

GENERAL DESCRIPTION

This manual is supplemental information for the electronic interface options on the PE series of pumps. For complete pump installation, disassembly and reassembly, safety information, and other general pump information, please refer to the PD pump manual that was also included with the pump.

This electronic interface includes options for solenoid control, end of stroke feedback, leak detection (diaphragm failure), cycle counting on the major valve, and a ported motor with no major valve for user-supplied control directly to the two diaphragm air chambers.

Solenoid control allows the cycle rate of the pump to be controlled electronically.

With Solenoid control, when the solenoid is energized, the pump strokes and dispenses the fluid in one chamber. When the solenoid is de-energized, the pump strokes in the opposite direction, dispensing the fluid in the other chamber.

By providing continuous ON - OFF signals to the solenoid, the fluid transfer rate may be increased or decreased remotely.

End of stroke feedback can be used in conjunction with the solenoid valve to cycle the pump based upon completion of each stroke.

The leak detection option incorporates an optical fluid sensor in each air chamber to provide a signal when a diaphragm has failed and fluid is leaking through the pump.

The cycle counter option provides a closed contact output each time the pump completes a cycle. This option is not available combined with solenoid control.

The ported motor with no major valve is provided as an option for users who want to supply compressed air directly to each diaphragm and control the operation of the pump with their own external air controls.

MODEL DESCRIPTION CHART

PEXX X-XXX-XXX -X X X X

Pump Size
10 - 1" EXP Diaphragm Pumps
15 - 1- 1/2" EXP Diaphragm Pumps
20 - 2" EXP Diaphragm Pumps
30 - 3" EXP Diaphragm Pumps

Center Section
A - Aluminium
S - Stainless Steel
R - Polypropylene

Revision Level

Specialty Code 1 (Blank if no Speciality Code)
A - Solenoid 120VAC
B - Solenoid 12VDC
C - Solenoid 240VAC
D - Solenoid 24VDC
G - Solenoid 12VDC ATEX
H - Solenoid 24VDC ATEX
K - Solenoid 220VAC ATEX
N - Solenoid with no coil
P - Ported Motor (no major valve provided)
S - Cycle Sensing on Major Valve
0 - Standard Valve Block (No Solenoid)

Specialty Code 2 (Blank if no Speciality Code)
E - End of stroke feedback + Leak Detection
F - End of stroke feedback
L - Leak Detection
0 - No Option

Special Testing
Testing for special testing options, please contact your nearest **ARO** Customer Service Representative or Distributor.

INGERSOLL RAND COMPANY LTD
209 NORTH MAIN STREET – BRYAN, OHIO 43506
(800) 495-0276 • FAX (800) 892-6276
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www.ingersollrandproducts.com

ARO Ingersoll Rand

PARTS LIST / PEXXA-XXX-XXX-XXXX

Item	Description	Part no	Qty
111	**Spool** (PE10A-XXX-XXX-X0XX, PE15A-XXX-XXX-X0XX)	95835	(1)
	(PE10A-XXX-XXX-XSXX, PE15A-XXX-XXX-XSXX)	95835-1	(1)
	All PE10A, PE15A with Solenoid	95835-2	(1)
	(PE20A-XXX-XXX-X0XX, PE30A-XXX-XXX-X0XX)	95651	(1)
	(PE20A-XXX-XXX-XSXX, PE30A-XXX-XXX-XSXX)	95651-1	(1)
	All PE20A, PE30A with Solenoid	95651-2	(1)
121	**Sleeve** (PEXXA-XXX-XXX-XPXX)	96323	(2)
134	**Screw** (M6 x 1 - 6g x 20 mm) (PEXXA-XXX-XXX-XPXX)	96340	(4)
135	**Valve Block** (PE10A-XXX-XXX-XSXX, PE10A-XXX-XXX-X0XX)	95942-3	(1)
	(PE15A-XXX-XXX-XSXX, PE15A-XXX-XXX-X0XX)	95942-1	(1)
	All PE10A with Solenoid	95942-6	(1)
	All PE15A with Solenoid	95942-5	(1)
	(PE20A-XXX-XXX-XSXX, PE20A-XXX-XXX-X0XX, PE30A-XXX-XXX-XSXX, PE30A-XXX-XXX-X0XX)	96334-1	(1)
	All PE20A, PE30A with Solenoid	96334-3	(1)
403	**Valve** (All PEXXA with Solenoid)	114102	(1)
407	**Adapter** (PEXXA-XXX-XXX-XAXX, PEXXA-XXX-XXX-XBXX, PEXXA-XXX-XXX-XCXX, PEXXA-XXX-XXX-XDXX, PEXXA-XXX-XXX-XGXX, PEXXA-XXX-XXX-XHXX, PEXXA-XXX-XXX-XKXX, PEXXA-XXX-XXX-XNXX)	96953	(1)

Item	Description	Part no	Qty
410	**Sensor** (for Cycle Sensing) (PEXXA-XXX-XXX-XSXX)	95276	(1)
411	**Adapter** (for Cycle Sensing) (PEXXA-XXX-XXX-XSXX)	96583	(1)
413	**Adapter Plate** (All PEXXA with Solenoid)	119380	(1)
414	**Coil ,120 VAC** (PXXXA-XXX-XXX-XAXX)	116218-33	(1)
	Coil ,12 VDC (PXXXA-XXX-XXX-XBXX)	116218-38	(1)
	Coil ,240 VAC (PXXXA-XXX-XXX-XCXX)	116218-35	(1)
	Coil ,24 VDC (PXXXA-XXX-XXX-XDXX)	116218-39	(1)
	Coil, 12 VDC ATEX (PXXXA-XXX-XXX-XGXX)	117345-38	(1)
	Coil, 24 VDC ATEX (PXXXA-XXX-XXX-XHXX)	117345-39	(1)
	Coil, 220 VAC ATEX (PXXXA-XXX-XXX-XKXX)	117345-35	(1)
415	**O-Ring** (All PEXXA with Solenoid)	114103	(1)
416	**O-Ring** (All PEXXA with Solenoid)	114104	(1)
417	**Screw** (All PEXXA with Solenoid)	96728647	(2)
418	**Tube** (All PEXXA with Solenoid)	15309974	(1)
419	**Seal** (All PEXXA with Solenoid)	96957	(1)
420	**Snap Ring** (All PEXXA with Solenoid)	Y147-43	(1)
421	**Retainer** (All PEXXA with Solenoid)	96954	(1)
425	**Magnet** (for Cycle Sensing) (PEXXX-XXX-XXX-XSXX)	95275	(1)
428	**O-Ring** (All PEXXA with Solenoid)	Y325-13	(1)
429	**Solenoid Muffler** (All PEXXA with Solenoid)	116464	(1)

PARTS LIST / PEXXS-XXX-XXX-XXXX

Item	Description	Part no	Qty
111	**Spool** (PE10S-XXX-XXX-X0XX, PE15S-XXX-XXX-X0XX)	95835	(1)
	(PE10S-XXX-XXX-XSXX, PE15S-XXX-XXX-XSXX)	95835-1	(1)
	All PE10S, PE15S with Solenoid	95835-2	(1)
	(PE20S-XXX-XXX-X0XX, PE30S-XXX-XXX-X0XX)	95651	(1)
	(PE20S-XXX-XXX-XSXX, PE30S-XXX-XXX-XSXX)	95651-1	(1)
	All PE20S, PE30S with Solenoid	95651-2	(1)
121	**Sleeve** (PEXXS-XXX-XXX-XPXX)	96323	(2)
134	**Screw** (M6 x 1 - 6g x 20 mm) (PEXXS-XXX-XXX-XPXX)	96340	(4)
135	**Valve Block** (PE10S-XXX-XXX-XSXX, PE10S-XXX-XXX-X0XX)	95939-3	(1)
	(PE15S-XXX-XXX-XSXX, PE15S-XXX-XXX-X0XX)	95939-1	(1)
	All PE10S with Solenoid	95939-6	(1)
	All PE15S with Solenoid	95939-5	(1)
	(PE20S-XXX-XXX-XSXX, PE20S-XXX-XXX-X0XX, PE30S-XXX-XXX-XSXX, PE30S-XXX-XXX-X0XX)	96337-1	(1)
	All PE20S, PE30S with Solenoid	96337-3	(1)
403	**Valve** (All PEXXS with Solenoid)	114102	(1)
407	**Adapter** (PEXXS-XXX-XXX-XAXX, PEXXS-XXX-XXX-XBXX, PEXXS-XXX-XXX-XCXX, PEXXS-XXX-XXX-XDXX, PEXXS-XXX-XXX-XGXX, PEXXS-XXX-XXX-XHXX, PEXXS-XXX-XXX-XKXX, PEXXS-XXX-XXX-XNXX)	96953	(1)

Item	Description	Part no	Qty
410	**Sensor** (for Cycle Sensing) (PEXXS-XXX-XXX-XSXX)	95276	(1)
411	**Adapter** (for Cycle Sensing) (PEXXS-XXX-XXX-XSXX)	96583	(1)
413	**Adapter Plate** (All PEXXS with Solenoid)	119380	(1)
414	**Coil ,120 VAC** (PXXXS-XXX-XXX-XAXX)	116218-33	(1)
	Coil ,12 VDC (PXXXS-XXX-XXX-XBXX)	116218-38	(1)
	Coil ,240 VAC (PXXXS-XXX-XXX-XCXX)	116218-35	(1)
	Coil ,24 VDC (PXXXS-XXX-XXX-XDXX)	116218-39	(1)
	Coil, 12 VDC ATEX (PXXXS-XXX-XXX-XGXX)	117345-38	(1)
	Coil, 24 VDC ATEX (PXXXS-XXX-XXX-XHXX)	117345-39	(1)
	Coil, 220 VAC ATEX (PXXXS-XXX-XXX-XKXX)	117345-35	(1)
415	**O-Ring** (All PEXXS with Solenoid)	114103	(1)
416	**O-Ring** (All PEXXS with Solenoid)	114104	(1)
417	**Screw** (All PEXXS with Solenoid)	96728647	(2)
418	**Tube** (All PEXXS with Solenoid)	15309974	(1)
419	**Seal** (All PEXXS with Solenoid)	96957	(1)
420	**Snap Ring** (All PEXXS with Solenoid)	Y147-43	(1)
421	**Retainer** (All PEXXS with Solenoid)	96954	(1)
425	**Magnet** (for Cycle Sensing) (PEXXX-XXX-XXX-XSXX)	95275	(1)
428	**O-Ring** (All PEXXS with Solenoid)	Y325-13	(1)
429	**Solenoid Muffler** (All PEXXS with Solenoid)	116464	(1)

PARTS LIST / PEXXR-XXX-XXX-XXXX

Item	Description	Part no	Qty
111	**Spool** (PE10R-XXX-XXX-X0XX, PE15R-XXX-XXX-X0XX)	96293	(1)
	(PE10R-XXX-XXX-XSXX, PE15R-XXX-XXX-XSXX)	96293-1	(1)
	All PE10R, PE15R with Solenoid	96293-2	(1)
	(PE20R-XXX-XXX-X0XX, PE30R-XXX-XXX-X0XX)	95651	(1)
	(PE20R-XXX-XXX-XSXX, PE30R-XXX-XXX-XSXX)	95651-1	(1)
	All PE20R, PE30R with Solenoid	95651-2	(1)
121	**Sleeve** (PEXXR-XXX-XXX-XPXX)	96323	(2)
134	**Screw** (M6 x 1 - 6g x 20 mm) (PEXXR-XXX-XXX-XPXX)	96340	(4)
135	**Valve Block** (PE10R-XXX-XXX-XSXX, PE10R-XXX-XXX-X0XX)	96174-1	(1)
	(PE15R-XXX-XXX-XSXX, PE15R-XXX-XXX-X0XX)	95834-1	(1)
	All PE10R with Solenoid	96174-4	(1)
	All PE15R with Solenoid	95834-4	(1)
	(PE20R-XXX-XXX-XSXX, PE20R-XXX-XXX-X0XX, PE30R-XXX-XXX-XSXX, PE30R-XXX-XXX-X0XX)	95789-1	(1)
	All PE20R, PE30R with Solenoid	95789-3	(1)
303	**Plastic Plug** (PEXXR-XXX-XXX-XPXX)	11481-7	(1)
403	**Valve** (All PEXXR with Solenoid)	114102	(1)
407	**Adapter** (PEXXR-XXX-XXX-XAXX, PEXXR-XXX-XXX-XBXX, PEXXR-XXX-XXX-XCXX, PEXXR-XXX-XXX-XDXX, PEXXR-XXX-XXX-XGXX, PEXXR-XXX-XXX-XHXX, PEXXR-XXX-XXX-XKXX, PEXXR-XXX-XXX-XNXX)	96953	(1)

Item	Description	Part no	Qty
410	**Sensor** (for Cycle Sensing) (PEXXR-XXX-XXX-XSXX)	95276	(1)
411	**Adapter** (for Cycle Sensing) (PEXXR-XXX-XXX-XSXX)	96581	(1)
413	**Coil Nut** (All PEXXR with Solenoid)	119380	(1)
414	**Coil ,120 VAC** (PXXXR-XXX-XXX-XAXX)	116218-33	(1)
	Coil ,12 VDC (PXXXR-XXX-XXX-XBXX)	116218-38	(1)
	Coil ,240 VAC (PXXXR-XXX-XXX-XCXX)	116218-35	(1)
	Coil ,24 VDC (PXXXR-XXX-XXX-XDXX)	116218-39	(1)
	Coil, 12 VDC ATEX (PXXXR-XXX-XXX-XGXX)	117345-38	(1)
	Coil, 24 VDC ATEX (PXXXR-XXX-XXX-XHXX)	117345-39	(1)
	Coil, 220 VAC ATEX (PXXXR-XXX-XXX-XKXX)	117345-35	(1)
415	**O-Ring** (All PEXXR with Solenoid)	114103	(1)
416	**O-Ring** (All PEXXR with Solenoid)	114104	(1)
417	**Screw** (All PEXXR with Solenoid)	96728647	(2)
418	**Tube** (All PEXXR with Solenoid)	15309974	(1)
419	**Seal** (All PEXXR with Solenoid)	96957	(1)
420	**Snap Ring** (All PEXXR with Solenoid)	Y147-43	(1)
421	**Retainer** (All PEXXR with Solenoid)	96954	(1)
425	**Magnet** (for Cycle Sensing) (PEXXX-XXX-XXX-XSXX)	95275	(1)
428	**O-Ring** (All PEXXR with Solenoid)	Y325-13	(1)
429	**Solenoid Muffler** (All PEXXR with Solenoid)	116464	(1)

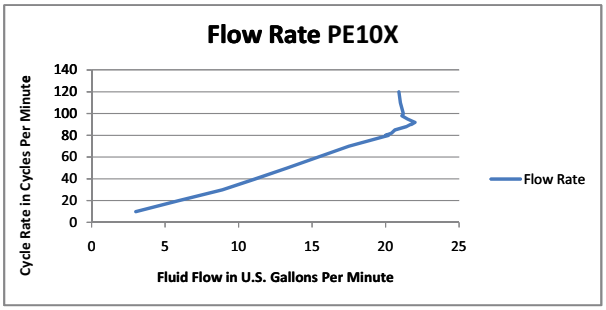
PARTS LIST / PEXXX-XXX-XXX-XXXX

Item	Description	Part no	Qty
74	**Pipe Plug** (PEXXA-XXX-XXX-XXFX, PEXXA-XXX-XXX-XX0X),(PEXXS-XXX-XXX-XXFX, PEXXS-XXX-XXX-XX0X)	Y17-51-6	(2)
	(PEXXR-XXX-XXX-XXFX, PEXXR-XXX-XXX-XX0X)	93832-3	(2)
126	**Plug** (PEXXA-XXX-XXX-XXLX, PEXXA-XXX-XXX-XX0X),(PEXXS-XXX-XXX-XXLX, PEXXS-XXX-XXX-XX0X)	59632-1	(1)
283	**Diaphragm Failure Detector** (PEXXA-XXX-XXX-XXEX, PEXXA-XXX-XXX-XXLX),(PEXXS-XXX-XXX-XXEX, PEXXS-XXX-XXX-XXLX)	96270-1	(2)
404	**Tubing** (0.417 ft) (PEXXA-XXX-XXX-XXEX, PEXXA-XXX-XXX-XXFX),(PEXXS-XXX-XXX-XXEX, PEXXS-XXX-XXX-XXFX)	94981-XXX-X	-
	(PEXXR-XXX-XXX-XXFX, PEXXR-XXX-XXX-XX0X)		
405	**Elbow** (PEXXA-XXX-XXX-XXEX, PEXXA-XXX-XXX-XXFX),(PEXXS-XXX-XXX-XXEX, PEXXS-XXX-XXX-XXFX)	59756-103	(1)
	(PEXXR-XXX-XXX-XXFX, PEXXR-XXX-XXX-XX0X)		
408	**Male Connector Fitting** (PEXXA-XXX-XXX-XXEX, PEXXA-XXX-XXX-XXFX),(PEXXS-XXX-XXX-XXEX, PEXXS-XXX-XXX-XXFX)	59764-4	(1)
	(PEXXR-XXX-XXX-XXFX, PEXXR-XXX-XXX-XX0X)		
412	**Wiring** (PEXXA-XXX-XXX-XXEX, PEXXA-XXX-XXX-XXFX),(PEXXS-XXX-XXX-XXEX, PEXXS-XXX-XXX-XXFX)	96965	(1)
	(PEXXR-XXX-XXX-XXFX, PEXXR-XXX-XXX-XX0X)		

Item	Description	Part no	Qty
422	**Manifold** (PEXXA-XXX-XXX-XXEX, PEXXA-XXX-XXX-XXFX),(PEXXS-XXX-XXX-XXEX, PEXXS-XXX-XXX-XXFX)	96969	(1)
	(PEXXR-XXX-XXX-XXFX, PEXXR-XXX-XXX-XX0X)		
423	**Nut** (PEXXA-XXX-XXX-XXEX, PEXXA-XXX-XXX-XXFX),(PEXXS-XXX-XXX-XXEX, PEXXS-XXX-XXX-XXFX)	96724182	(1)
	(PEXXR-XXX-XXX-XXFX, PEXXR-XXX-XXX-XX0X)		
424	**Lock Washer** (PEXXA-XXX-XXX-XXEX, PEXXA-XXX-XXX-XXFX),(PEXXS-XXX-XXX-XXEX, PEXXS-XXX-XXX-XXFX)	96712666	(1)
	(PEXXR-XXX-XXX-XXFX, PEXXR-XXX-XXX-XX0X)		
426	**Mounting Strap** (PEXXA-XXX-XXX-XXEX, PEXXA-XXX-XXX-XXFX),(PEXXS-XXX-XXX-XXEX, PEXXS-XXX-XXX-XXFX)	96964	(1)
	(PEXXR-XXX-XXX-XXFX, PEXXR-XXX-XXX-XX0X)		
427	**Pressure Sensor** (PEXXA-XXX-XXX-XXEX, PEXXA-XXX-XXX-XXFX),(PEXXS-XXX-XXX-XXEX, PEXXS-XXX-XXX-XXFX)	96961	(1)
	(PEXXR-XXX-XXX-XXFX, PEXXR-XXX-XXX-XX0X)		

GENERAL DESCRIPTION

Without end of stroke feedback, solenoid control can only be used to cycle the pump based on timing. The following curves represent the flow rates of a pump based on timed operation of the solenoid at a common operating point of 70 psi air pressure and 30 psi of back pressure.



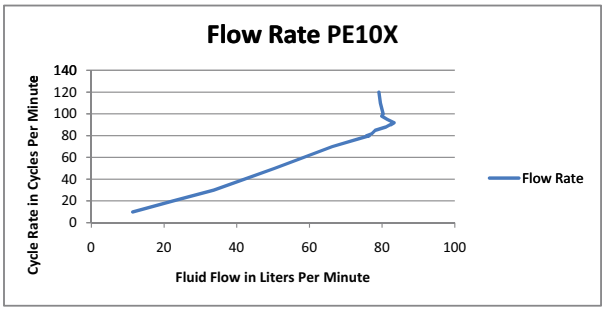
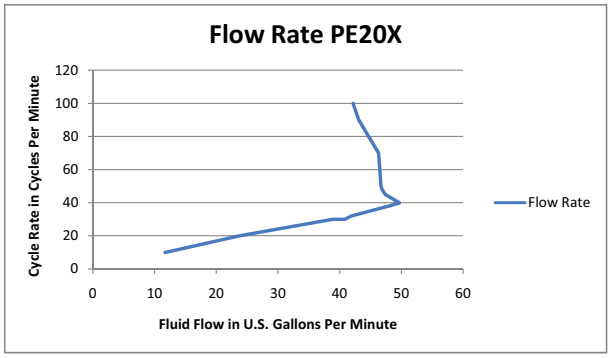


Figure 1



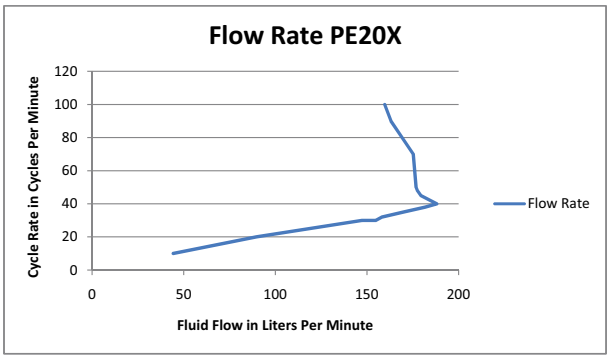
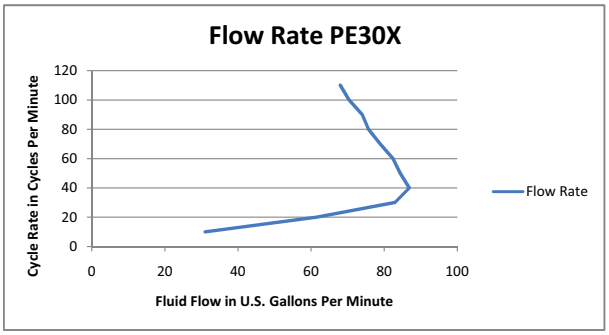


Figure 2



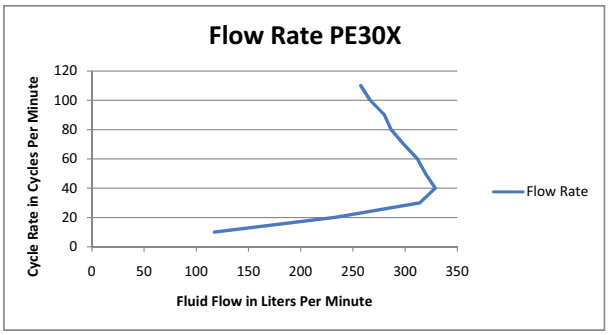


Figure 3

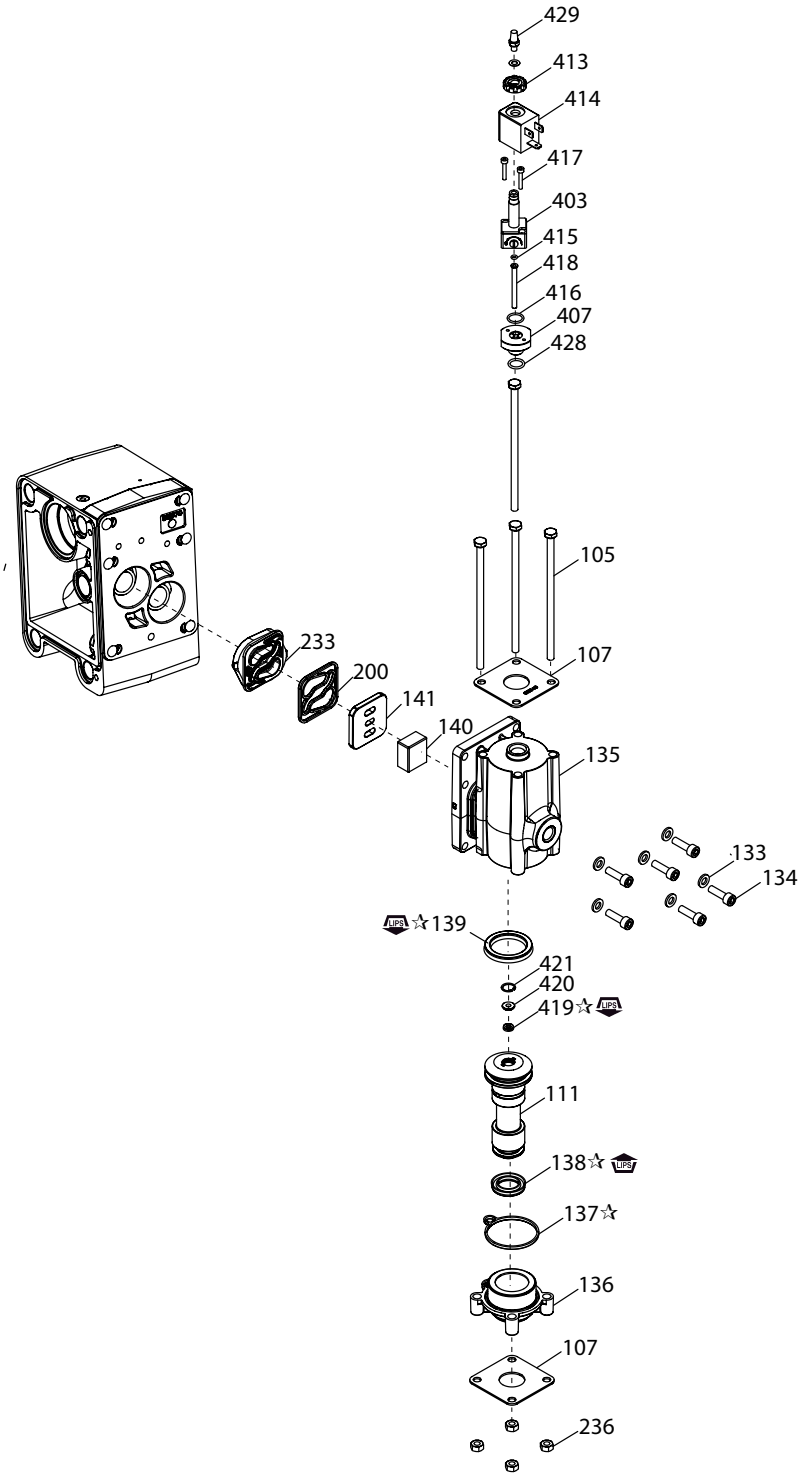


Figure 4

☞ LUBRICATION / SEALANTS ☜

☆ Apply Lubriplate FML-2 grease (94276) to all "O" rings, "U" cups and mating parts.

END OF STROKE

GENERAL DESCRIPTION

With end of stroke feedback from a pressure switch, the solenoid can be used to cycle the pump based on known feedback that the pump has fully completed each stroke.

PRESSURE SWITCH OPERATION

A calibration procedure is necessary for proper operation of the pressure switch and accurate end of stroke feedback from the pump. The Reset ring will always have a lower pressure value than the Set ring.

1. Determine the operating air pressure of the pump.
2. The Reset ring should be set to approximately 25% of the operating pressure of the pump with a minimum of 10 PSI.
3. The **Set** ring should be set to approximately 50% of the operating pressure of the pump. This value is more variable depending on the specific operating conditions. The switch may function properly at much lower values for the Set ring if the pump is running slowly, or at lower operating pressures. In general, high operating speeds and pressures require a higher setting value of the Set ring.
4. Operate the pump slowly to ensure proper operation of the pressure switch. When the pump has shifted to one side, the yellow LED will illuminate and remain on until the pump shifts back to the opposite side.
5. If the operating pressure of the pump changes, the **Set** ring may need to be adjusted accordingly.

SETTING / OPERATION

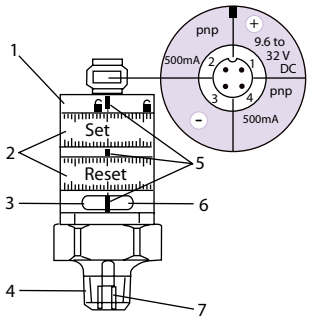


Figure 5

1. Locking Ring
2. Setting Rings (manually adjustable after unlocking)
3. LED green: supply voltage O.K.
4. Process connection ¼" NPT; tightening torque 25 Nm
5. Setting Marks
6. LED yellow: Set values reached, OUT1 = ON / OUT2 = OFF
7. Internal Thread M5

- Minimum distance between Set and Reset = 2% of the final value of the measuring range.
- To obtain the setting accuracy: Set both rings to the minimum value, then set the requested value.

PART LIST / PEXX<u>X</u>-XXX-XXX-XX<u>E</u>X, PEXX<u>X</u>-XXX-XXX-XX<u>F</u>X

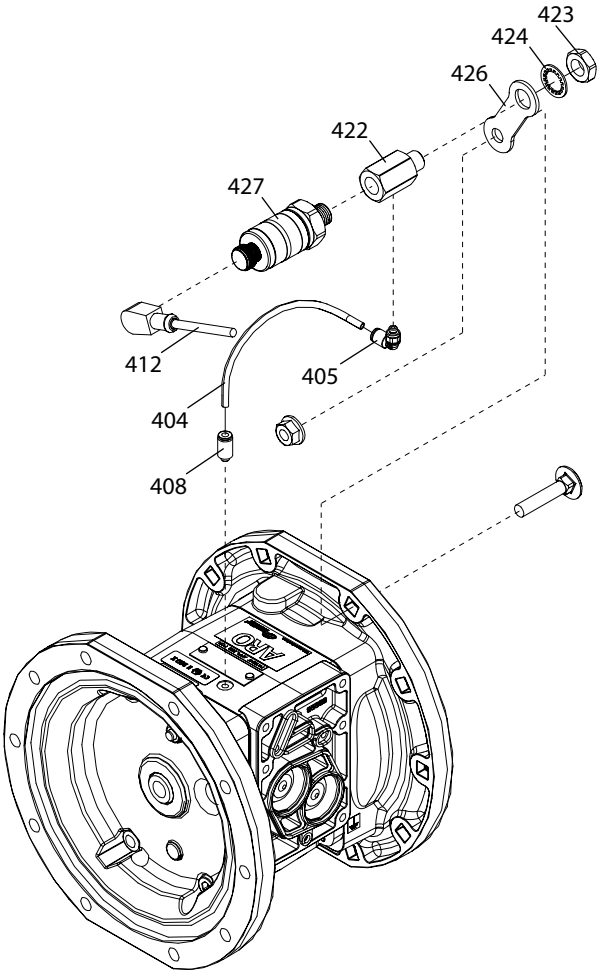


Figure 6

LEAK DETECTION (DIAPHRAGM FAILURE DETECTOR)

GENERAL DESCRIPTION

An ARO® diaphragm pump equipped with the ARO Diaphragm Failure Detector warns of a diaphragm failure by sensing the presence of liquid in the air chamber of the pump. This system uses a liquid sensor in each of the two air chambers which will send an output signal when fluid is detected.

INSTALLATION AND WARNINGS

NOTE: ALL WIRING MUST COMPLYWITH ALL LOCAL AND / OR NATIONAL ELECTRICAL CODES.

- Electrical codes that apply must be strictly adhered to; failure to do so may lead to shock hazard or serious injury.
- Some local electrical codes may require the installation of rigid conduit.
- The diaphragm failure detector components must be installed by a qualified electrician in compliance with all national, state and local codes and regulations to reduce the risk of electrical shock or other serious injury during installation and operation.
- ARO is not responsible for accidents resulting from improper installation of components or hardware.
- **HAZARDOUS VOLTAGE**. Do not attempt any service without disconnecting all electrical supply sources.

PART LIST / PEXXX-XXX-XXX-XXEX, PEXXX-XXX-XXX-XXLX

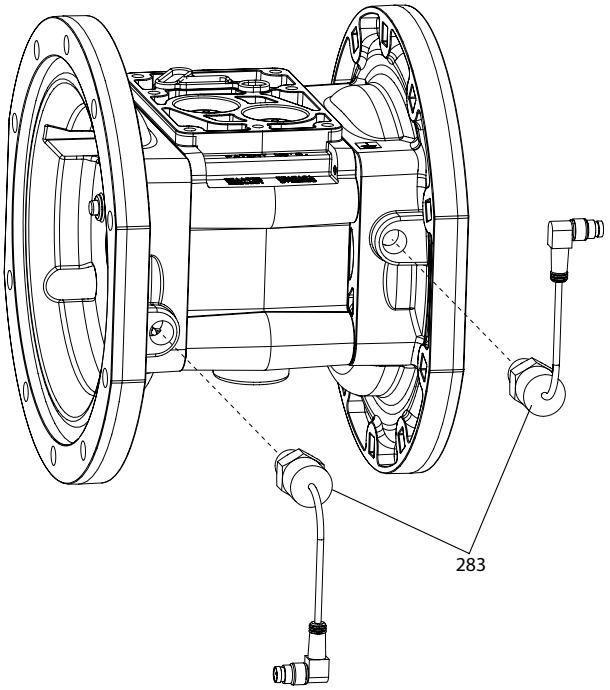


Figure 7

LEAK DETECTION (DIAPHRAGM FAILURE DETECTOR) - PINOUT DESCRIPTIONS

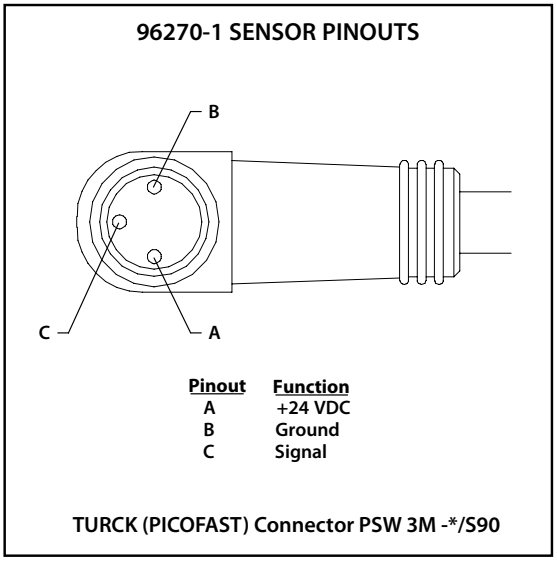
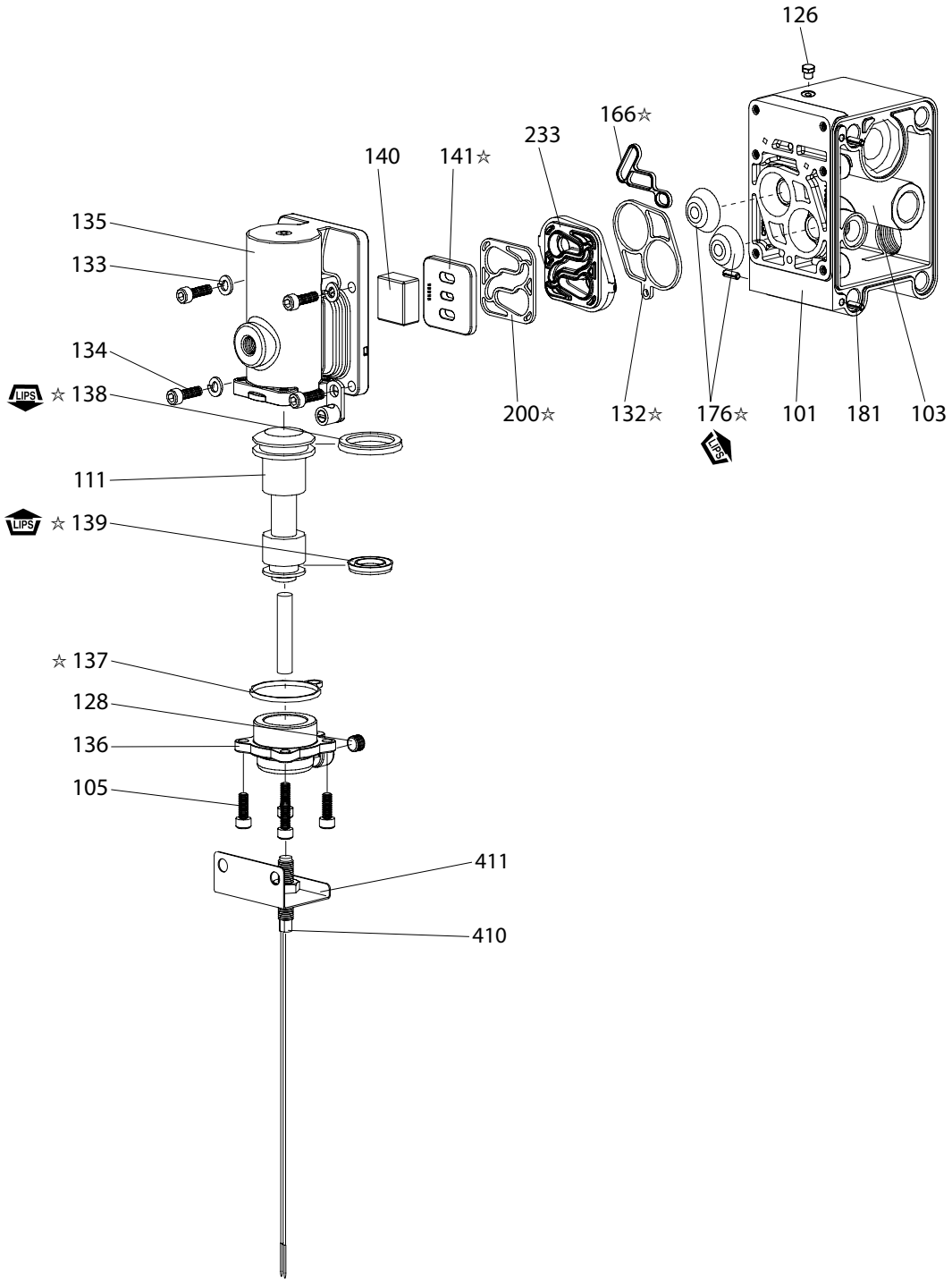


Figure 8

GENERAL DESCRIPTION

The ARO diaphragm pump cycle counter provides a closed contact output each time the pump completes a cycle. This signal may be used to record cycles for maintenance purposes or batching if the discharge volume of each complete cycle is known.

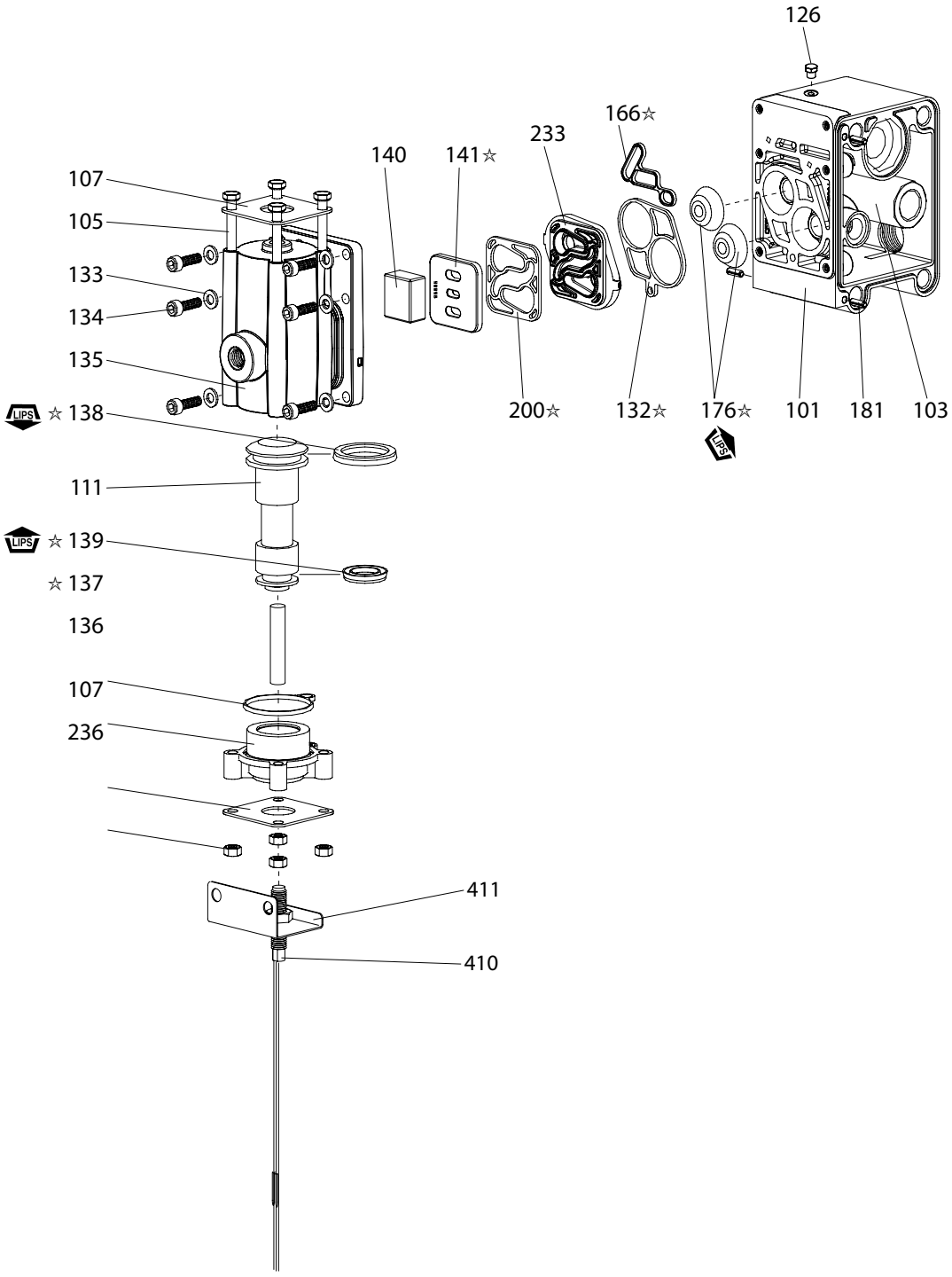
PART LIST - PEXX<u>A</u>-XXX-XXX-X<u>S</u>XX / PEXX<u>S</u>-XXX-XXX-X<u>S</u>XX



☞LUBRICATION / SEALANTS ☜

☆ Apply Lubriplate FML-2 grease (94276) to all "O" rings, "U" cups and mating parts.

Figure 9



☞LUBRICATION / SEALANTS ☜

☆ Apply Lubriplate FML-2 grease (94276) to all "O" rings, "U" cups and mating parts.

Figure 10

OPERATION

Maximum Operating Voltage . . . . . 200 V DC
Switching Current . . . . . 0.5 Amps
The pump may be interfaced with a control device in the following ways:

As a SOURCING switch (see figure 1) for use with PLC's.
As a SINKING switch (see figure 2) for use with PLC's.
As a closed contact switch (see figure 3) for use with meters.

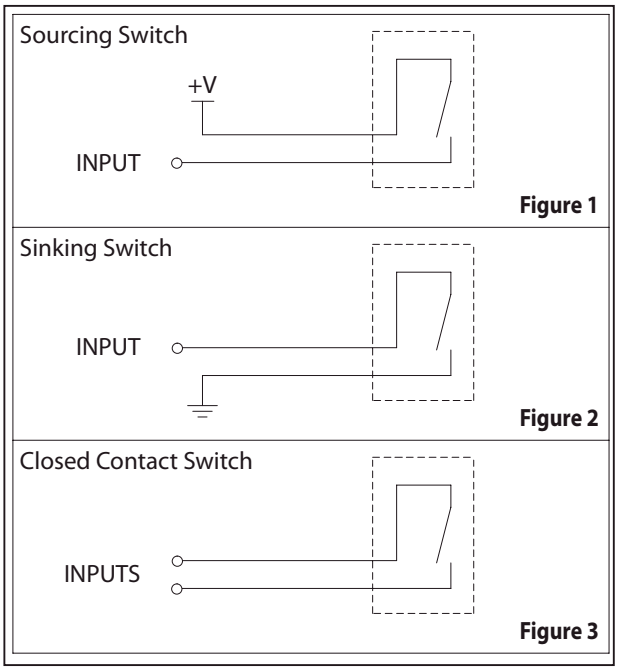


Figure 11

PART LIST- PEXXA-XXX-XXX-XPXX / PEXXS-XXX-XXX-XPXX

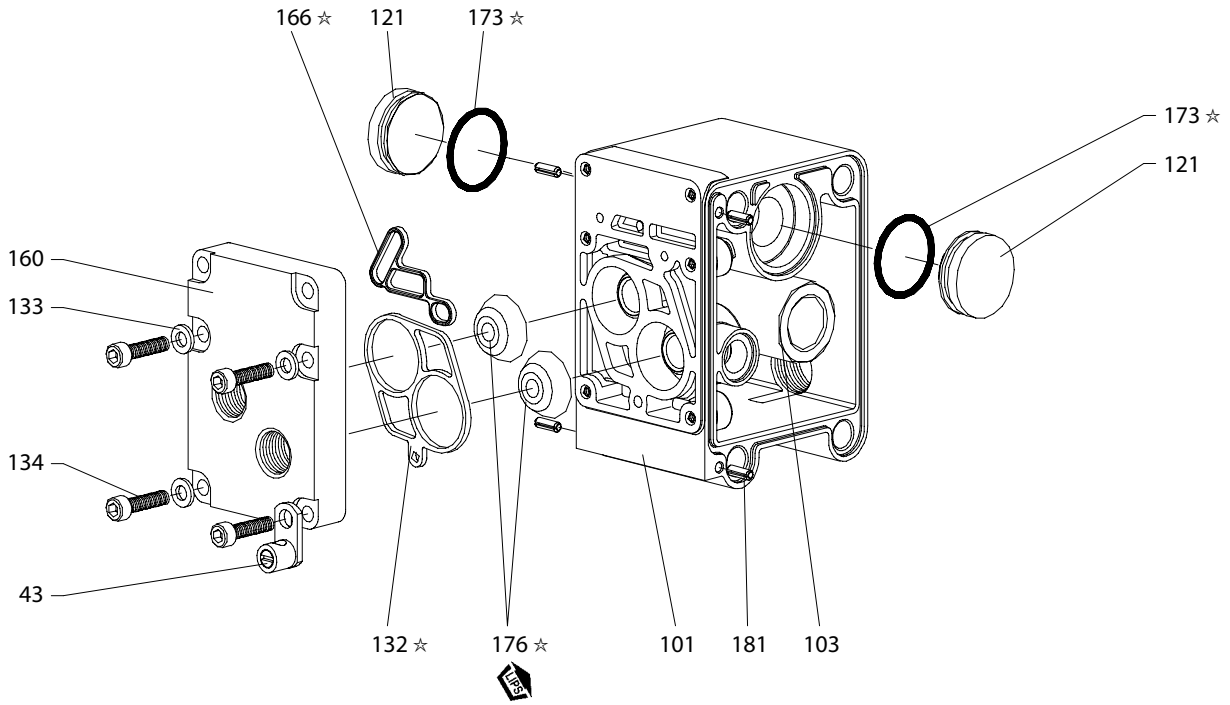


Figure 12

PART LIST- PEXXR-XXX-XXX-XPXX

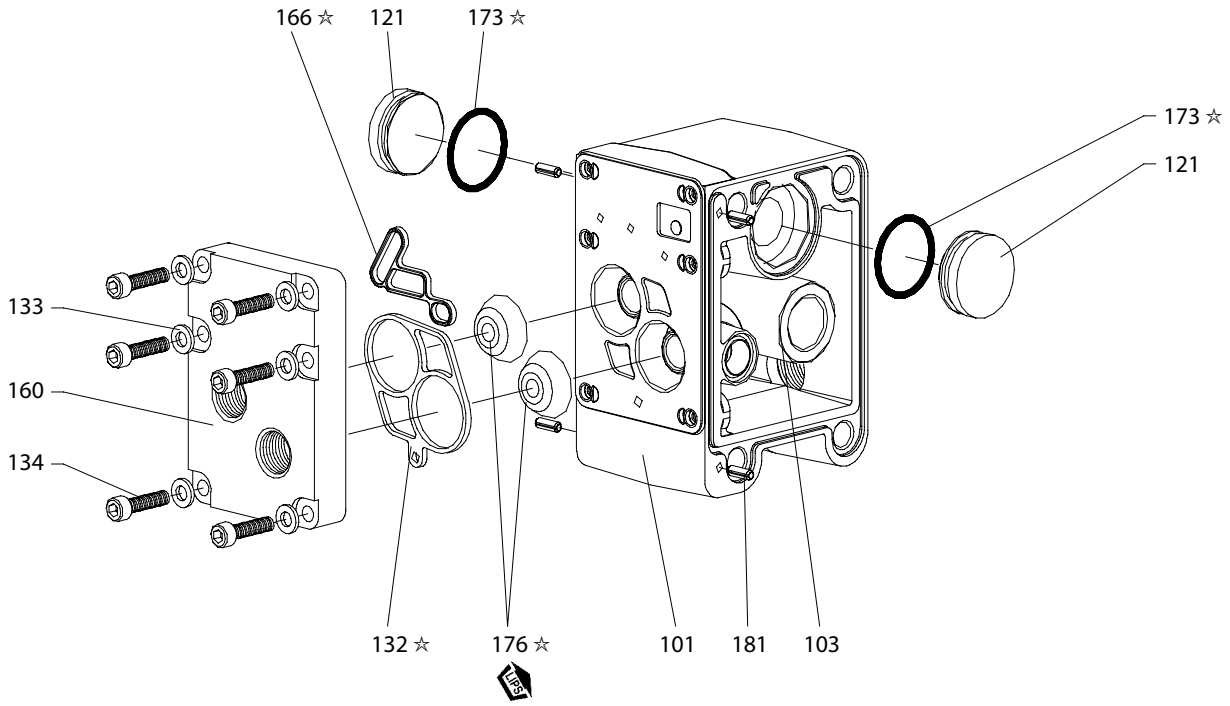


Figure 13

☞LUBRICATION / SEALANTS ☜

☆ Apply Lubriplate FML-2 grease (94276) to all "O" rings, "U" cups and mating parts.